

Measurement Set 8VSB

▶ RFA300A



▶ Features & Benefits

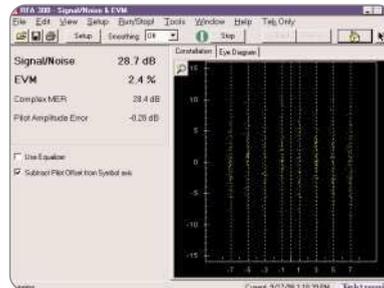
- Interactive and Automated Measurements
- Proprietary Nonlinearity Measurement
- Two Switchable RF Inputs
- User Programmable Limits Mask
- Proprietary In-service Phase Noise Measurement
- One Touch Operation

▶ Applications

- 8VSB Transmitter Installation
- Continuous Monitoring with Limits Checking
- Repair and Maintenance

The Tektronix RFA300A provides fast, easy and efficient solutions for 8VSB RF measurement needs while delivering the measurement accuracy and ease of use you've come to expect from Tektronix. The range of capabilities offered by the RFA300A includes all measurement functions required to install, operate and maintain an 8VSB transmitter. The RFA300A brings the heritage of the Tektronix VM700 to RF measurements for 8VSB DTV transmitters. The RFA300A provides a suite of measurements that permit the user to examine or measure important DTV parameters including constellation, eye diagram, peak to average power ratio, linear errors and non-linear distortion. Measurement displays provide numeric data augmented with easy to interpret graphics which allow the operator to visually determine operational performance of the transmitter. The RFA300A can measure individual operating parameters or provide continuous monitoring of transmitter operation with notification if user-selectable limits are violated.

Measurements and Graphic Displays



- ▶ Signal/Noise Ratio, Error Vector Magnitude, Complex Modulation Error Ratio, Pilot Amplitude Error with Constellation Display and Eye Diagram Graphics.

Signal/Noise, the ratio of the ideal real axis signal power to all other contributions (noise, distortion, etc.), is an all-in-one quality measurement of the 8VSB signal. Error Vector Magnitude is the square root of the mean complex relative noise power divided by the real (in-phase) part of the outermost constellation state. Modulation Error Ratio is a com-

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plex form of the Signal/Noise measurement, which is made by including quadrature channel information in the ideal and error signal computations. Out-of-channel emissions are spectral power vs. frequency measurements similar to those made by a spectrum analyzer. The measurement is made and scaled in accordance with the complex, FCC specified method. The RFA300A measures to > -80 dB on the FCC scale.

Transmitter Frequency Response Error measurements are plots of the transmitter's spectral amplitude vs. frequency with respect to the ideal 8VSB root-cosine transmitter curve.

Transmitter Group Delay Error measurements are plots of the transmitter's group delay response as a function of frequency.

Amplitude Error is the difference between the transmitter's actual vs. its ideal instantaneous output amplitude. This difference is plotted vs. the ideal instantaneous signal amplitude, resulting in a display of the transmitter's dynamic power linearity.

Phase Error similarly plots the carrier's phase angle error as a function of instantaneous signal amplitude. These nonlinear distortion measurements are unique to the RFA300A.

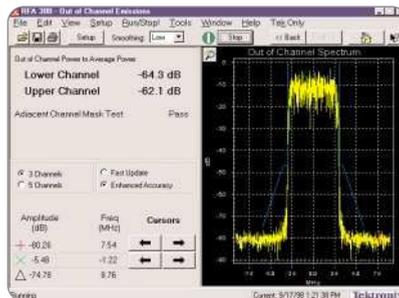
The In-service Phase Noise measurement displays the transmitter's Phase Noise characteristics.

Normally only available as an out-of-service measurement, in-service phase noise is an RFA300A proprietary measurement.

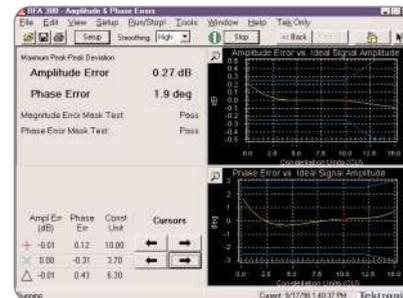
Peak to Average power ratio displays the statistical amplitude distribution of the transmitter's signal. It is another way of determining the transmitter's power linearity.

Simple Operation

Operation of the RFA300A is extremely user-friendly. No detailed 8VSB knowledge is required to make accurate measurements. The high-resolution color display provides a clear view of measurement results and waveforms. A VGA output is also provided to drive an external monitor. Instrument con-



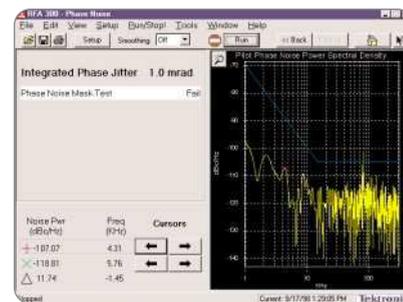
▶ *Out-of-channel Power to Average Power with Spectral Display.*



▶ *Nonlinear Distortion Measurements with Graphs of Amplitude Error vs. Ideal Signal Amplitude and Signal Phase Error vs. Ideal Signal Amplitude.*



▶ *Frequency Response and Group Delay Measurements with Graphical Displays of Errors.*



▶ *Integrated Phase Jitter with display of Noise Power Spectral Density.*

rol is by mouse, a VM700-like touch screen, front panel buttons and knob or by keyboard entry. Key parameters and measured values are displayed in easy to read form, both numerically (in large text and graphically).

▶ Signal Monitor Mode

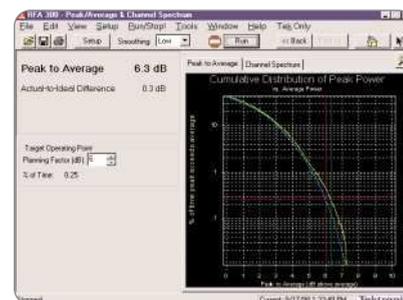
- Unattended monitoring of 8VSB signals
- User-specified limits (Two levels, Caution and Alarm)
- Notification when limits or masks are exceeded
- Notification to control point or local (Dry Contact Closure)

▶ Remote measurement and control

- pcANYWHERE (not included)

▶ Printing

- All devices supported by Windows NT® (serial or parallel)



▶ *Peak to Average Power and Actual-to-ideal Difference with Cumulative Distribution of Peak Power and Channel Spectrum Graphics.*

▶ Characteristics

RF Section

Tuning Range – Channels 7 to 69 (174 to 806 MHz).

RF Sensitivity –

+10 to +33 dBm with external 10 dB attenuator.

0 to +30 dBm without external 10 dB attenuator.

Return Loss – > 25 dB.

Input Impedance – 50 Ω.

Input Connector – Type N.

Specifications

Signal to Noise Accuracy – $\leq \pm 1$ dB.

Residual Signal to Noise – ≥ 40 dB.

Error Vector Magnitude Accuracy – $\leq \pm 12\%$ of actual value.

Modulation Error Ratio Accuracy – $\leq \pm 1$ dB.

Adjacent Channel Residual Noise Floor – ≤ -80 dB on the FCC scale.

Frequency Response Accuracy – $\leq \pm (0.25 + .05 \times \text{p-p reading})$ dB.

Group Delay Accuracy – $\leq \pm (4 + 0.2 \times \text{p-p reading})$ ns.

Pilot Amplitude Accuracy – $\leq \pm (0.1 + 0.2 \times \text{reading})$ dB.

Amplitude Error – $\leq \pm (0.1 + 0.2 \times \text{reading})$ dB.

Phase Error – $\leq \pm (5 + 0.2 \times \text{reading})$ degrees.

Out-of-channel Spectrum Accuracy – $\leq \pm 2$ dB over a frequency range of 18 or 30 MHz.

General Characteristics

Environmental

Temperature –

Operating: 0°C to +45°C (32°F to 113°F).

Nonoperating: -20°C to +60°C (-4°F to 140°F).

Humidity: 20% to 80% noncondensing.

Altitude –

Operating: 10,000 ft. (Temp derated above 5,000 ft.).

Nonoperating: 40,000 ft.

Dimensions	mm	in.
Height	216	8.5
Width	432	17.0
Depth	559	22.0
Weight	kg	lbs.
Net	17.2	38.0

Power

Source Power –

Voltage Range: 95 to 250 V.

Line Frequency: 47 to 63 Hz.

Current: 6 A max, 1.9 A typical.

▶ Ordering Information

RFA300A

Measurement Set 8VSB.

Includes: User Manual, Power Cord, Keyboard, Mouse, Front Cover, Back up Software.

International Power Plugs

Opt. A1 – Universal Euro 220 V, 50 Hz.

Opt. A2 – UK 240 V, 50 Hz.

Opt. A4 – North American 240 V, 60 Hz.

Opt. 1R – Rackmount Kit.

Opt. R3 – Three-year Warranty Extension.

Optional Accessories

Protective Cover – 200-4408-00.

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